

CLAIMS

What is claimed is:

1. An apparatus comprising:
 - a light source to emit light to pass through a portion of a track of windows,
- 5 with the portion of the track configured to allow a different amount of the light to pass through relative to other portions of the track; and
 - a plurality of sensors to sense the light for encoding and indexing.
2. The apparatus of claim 1, wherein the portion includes a configuration to allow more of the light to pass through relative to the other portions of the track.
- 10 3. The apparatus of claim 1, wherein the portion includes a configuration to allow less of the light to pass through relative to the other portions of the track.
4. The apparatus of claim 1, wherein each of the plurality of sensors is configured to sense the light for encoding as well as indexing.
- 15 5. The apparatus of claim 1, wherein the sensors are linearly configured with a first and a second of the plurality of sensors disposed at both ends, configured to sense the light for indexing, while others are configured to sense the light for encoding.
6. The apparatus of claim 1, wherein the apparatus further comprises a code wheel, on which the windows are disposed.
- 20 7. The apparatus of claim 1, wherein each of the plurality of sensors is configured to sense the light for encoding as well as indexing, and the sensors output signals reflective of the amount of light the sensors sensed; and

the apparatus further comprises means to process the output signals and generate derivative signals based at least in part on the output signals for encoding and indexing respectively.

8. The apparatus of claim 1, wherein the sensors include photocells.

5 9. The apparatus of claim 1, wherein the windows include transparent windows.

10. A position sensing method comprising:
emitting light to pass through a portion of a track of windows, the portion configured to allow a different amount of the light to pass through relative to other
10 portions of the track; and
sensing the light.

11. The method of claim 10, wherein the method further comprises the sensors outputting signals reflective of the amount of light the sensors sensed, and processing the output signals to generate a first and a second derivative
15 signal based at least in part on the output signals for encoding and indexing respectively.

12. An imaging system
a communication interface to receive data of an image; and
an imaging engine coupled to the communication interface to form the
20 image, including a moveable element and a position sensing assembly to sense a current location of the moveable element, the position sensing assembly having a code sheet and a combined encoder and index sensor arrangement, the code sheet having a track of non-uniformly distributed windows.

13. The imaging system of claim 12, wherein the track of non-uniformly
25 distributed windows includes a number of portions with a portion configured to allow more light to pass through than other like portions.

14. The imaging system of claim 12, wherein the track of non-uniformly distributed windows includes a number of portions, with a portion configured to allow less light to pass through than other like portions.

15. The imaging system of claim 12, wherein the combined encode and index
5 sensor arrangement includes a plurality of sensors to sense light passed through the windows concurrently for encoding and indexing.

16. The imaging system of claim 15, wherein the sensors include photocells.

17. The imaging system of claim 12, wherein the combined encode and index
sensor arrangement includes a plurality of linearly configured sensors with a first
10 and a second of the sensors disposed at the respective ends to sense light
passed through the windows for indexing, and the rest of the sensors to sense
light passed through the windows for encoding.

18. The imaging system of claim 12, the windows include transparent
windows.

15 19. An apparatus comprising:
a first and a second plurality of sensors; and
a light source to emit light in two or more directions, with one of the two or
more directions being an angular direction, and the light to be sensed by the first
and the second plurality of sensors after passing through a first window of an
20 encoder track, and a second window of an index track respectively, with either
the first window, the second window or both refracting the passing light.

20. The apparatus of claim 19, wherein the light emitted to pass the first
window of the encoder track is emitted in an angular direction.

21. The apparatus of claim 19, wherein the light emitted to pass the second
25 window of the index track is emitted in an angular direction.

22. The apparatus of claim 19, wherein the light source includes a lens having two areas with two different refraction indices to facilitate emission of light in the two directions.

23. A code sheet comprising

5 a medium;
an encoder track of first windows disposed on the medium;
an index track of second windows disposed on the medium; and
a selected one of the first windows and the second windows have a refractive index suitable to refract light in a predetermined angle.

10 24. The code sheet of claim 23, wherein the first windows have a refractive index suitable for refracting the light in the predetermined angle.

25. The code sheet of claim 23, wherein the second windows have a refractive index suitable for refracting lights in the predetermined angle.

15 26. The code sheet of claim 23, wherein the second windows interleave with some of the first windows.

27. The code sheet of claim 23, wherein the medium has a selected one of a wheel form factor and a linear form factor.

28. A position sensing method comprising:

20 emitting light in a first direction and a second direction, one of which being an angular direction, for sensing by a first and a second plurality of sensors after passing first windows of an encoder track and second windows of an index track respectively, with either the first windows, the second windows or both refracting the passing light; and

sensing the light employing the first and second plurality of sensors.

29. The method of claim 28, wherein said emitting of light in two directions comprises emitting lights angularly to be refracted by selected ones of the windows of the encoder track.

30. The method of claim 28, wherein said emitting of light in two directions 5 comprises emitting light angularly to be refracted by a selected one of the windows of the index track.

31. An imaging system
a communication interface to receive data of an image to be formed ; and
an imaging engine coupled to the communication interface to form the 10 image, including a moveable element and a position sensing assembly to sense a current location of the moveable element, the position sensing assembly having a code sheet and a combined encoder and index sensor arrangement for sensing of the current location of the moveable element employing angular emission of light, refraction and sensing of the light.

15 32. The imaging system of claim 31, wherein the combined encoder and index sensor arrangement comprises
a first and a second plurality of sensors; and
a light source to emit light in two directions, with one of the two directions being an angular direction.

20 33. The imaging system of claim 32, wherein the light source emits light in an angular direction towards windows of an encoder track for passing onto a number of sensors of the combined encoder and index sensor arrangement.

34. The imaging system of claim 32, wherein the light source emits light in an angular direction towards windows of an index track for passing onto a number of 25 sensors of the combined encoder and index sensor arrangement.

35. The imaging system of claim 32, wherein the code sheet comprises

a medium;
an encoder track of first windows disposed on the medium, the first windows having a first refractive index; and
an index track of second windows disposed on the medium, the second windows having a second refractive index.

5 36. The imaging system of claim 35, wherein the windows of the index track interleave with some of the windows of the encoder track.

37. The imaging system of claim 35, wherein the medium has a selected one of a wheel form factor and a linear form factor.

10 38. An apparatus comprising:
first means to sense emitted light; and
second means to emit light in two directions, with one of the two directions being an angular direction, to be sensed by the first means after passing a first window of an encoder track and a second window of an index track respectively,
15 with either the first window, the second window or both refracting the passing light.

39. The apparatus of claim 38, wherein the apparatus further comprises a code wheel, on which the encoder and index tracks are disposed.